

Two New Humicolous Trechines (Coleoptera, Trechinae) from Shennongjia, Western Hubei

Shun-Ichi UÉNO

Department of Zoology, National Science Museum (Nat. Hist.),
3–23–1 Hyakunin-chô, Shinjuku, Tokyo, 169–0073 Japan

Abstract Two new humicolous species of trechine beetles are described from Shennongjia in western Hubei, West-central China. One of them belongs to a new genus whose true affinity is not certain, but may have a remote relationship to the *Agonotrechus* series. It is named *Shennongotrechus politus*. The other species is a member of the grand genus *Trechus*, and is closely similar to *T. qinlingensis* (MORAVEC et WRASE). It is regarded as a new subspecies of the Qin Ling species and is named *T. (Epaphius) qinlingensis shennongi*.

Shennongjia Linqu, or the Shennongjia forest area, lies near the eastern end of the Daba Shan Mountains and is well known for the conservation of beautiful natural forests consisting of various elements from the warm-temperate to the cold-temperate floras. Its southern part is rigidly protected as a national nature reserve, faunal investigations in which are severely controlled by the government. For this reason, only a limited number of entomologists have been able to make collectings in the reserve.

Four different species of trechine beetles have hitherto been recorded from the forest reserve, that is, *Epaphiopsis (Epaphiama) lamellata* S. UÉNO et YU (1997, p. 25, figs. 1–3), *Boreaphaenops angustus* S. UÉNO (2002, p. 415, figs. 1–3), *Trechus (Epaphius) shennongjianus* (DEUVE) (2002, p. 158, figs. 2, 14), and *Balazucellus hubeicola* (DEUVE, 2001, p. 46, fig. 3). With the exception of cavernicolous *Boreaphaenops angustus*, all the three species were recorded from the subalpine forest of *Abies* and *Rhododendron* on or near Dashennongjia, above 2,500 m above sea-level. Through the arrangement made by FAN Ting of the Academia Sinica, I have been given opportunities to visit the nature reserve twice and to pursue faunal researches, mainly of ground-living beetles. I have succeeded in finding out the natural habitats of all the described species of trechine beetles, and besides, in bringing forth two more species in the Shicao He Valley (formerly called the Shimie He Valley) at the eastern foot of Dashennongjia.

This valley is a tributary of the Shennongjia Xi River (formerly called the Muyu He River), arising from the eastern and southeastern sides of Dashennongjia. It is forked near Guanmen Shan at about 6 km east by south of Dashennongjia in a beeline. The northern branch is called the Xiangshui He (or the Xiang'yan He) and the south-

ern one the Yang'juan He. The trechine beetles were discovered at the left side of the latter about 500 m upstream from the fork.

There were small depressions between the riverside road and the steep forested slope, in which was accumulated leaf litter, particularly among stones fallen from the slope. These depressions were shaded by deciduous broadleaved trees and very humid. A series of specimens of a small apterous species of *Trechus*, to be named *T. qinlingensis shennongi* in the present paper, were first sifted out from the litter, and then three specimens of a larger species came out mingled with the *Trechus*. After a close examination, it became apparent that the *Trechus* is a geographical race of *T. qinlingensis* (MORAVEC et WRASE) (1998, p. 211, figs. 1, 16), but that the true affinity of the larger species was not satisfactorily clarified at present. It resembles *Dabatrechus* S. UENO, 2004 in many respects, but appears to have some relationship to certain genera of the *Trechoblemus* series from different viewpoints. In any case, it cannot be placed in any of the described genera of the Trechinae, so that a new genus, to be called *Shennongotrechus*, will be erected for the species, which will be named *Shennongotrechus politus*.

The abbreviations employed in this paper are the same as those explained in previous papers of mine.

Before going into further details, I wish to express my heartfelt thanks to Dr. Masataka SATÔ as well as to Messrs. FAN Ting and ZHAO Ben Yuan for their invaluable help extended to me in field works. Heartly thanks are also due to Mr. David W. WRASE, who kindly gave me the opportunity to examine the paratypes of *Epaphius qinlingensis* and *E. castificus* from the Qin Ling Mountains, which were indispensable for determining the true systematic position of the Shennongjia beetle.

Genus *Shennongotrechus* S. UENO, nov.

Type species: *Shennongotrechus politus* S. UENO, sp. nov.

Erected for a relatively small humicolous trechine of uncertain affinity with fairly elongate body devoid of hind wings. Body surface covered with minute pubescence on both dorsum and venter; microsculpture mostly evanescent, though vestiges of fine transverse lines are perceptible on limited portions of head and pronotum. Colour brown, shiny; legs paler.

Head transverse, depressed above, with deep frontal furrows and only feebly convex frons; supraorbital areas relatively flat, each with two supraorbital pores closely located one after the other; eyes small and flat, though clearly faceted and covered with minute pubescence; genae tumid, a little shorter than eyes, and sparsely covered with very short hairs; labrum transverse, with the apical margin deeply emarginate. Mandibles stout though sharply hooked at apices; right mandible tridentate, with prominent premolar tooth but very obtuse proximal tooth of retinaculum. Mentum fused with submentum, deeply foveolate on each side, mental tooth broad, truncated and slightly emarginate at the apex; submentum quadrisetose, outer pair of setae being

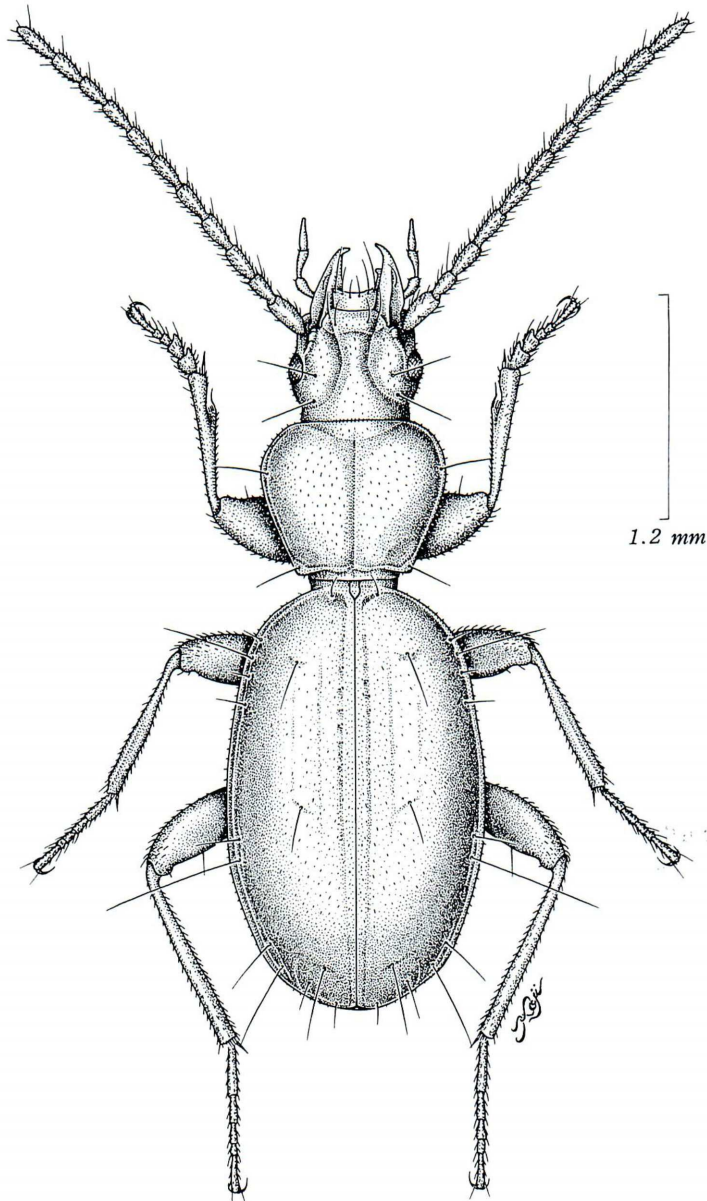


Fig. 1. *Shennongotrechus politus* S. UENO, gen. et sp. nov., ♂, from the Shicao He Valley in Shennongjia.

much longer than the inner; ligula protrudent at the middle, octosetose, paraglossae thin; labial palpus short and stout, penultimate palpomere dilated towards apex and quadrisetose, apical palpomere slightly shorter than the penultimate. Maxillae stout,

arcuate, and bearing several spines and hairs on the inner margin; maxillary palpus short and stout, penultimate palpomere particularly short, widely dilated towards apex and with several minute hairs, apical palpomere slightly more than twice as long as the penultimate, elongated subconical. Antennae short and stout, subfiliform.

Pronotum subcordate and convex, with the sides narrowly and sharply bordered throughout, though the borders become much narrower and diminished towards front angles; lateral margins minutely ciliated except for basal portions, particularly densely near front angles, with two pair of marginal setae, of which the anterior one is located at the widest part and the posterior one slightly before hind angles; apex gently arcuate forwards, with front angles rounded off; base briefly subpedunculate, nearly straight at middle and deeply emarginate on each side just inside hind angle, which is narrowly rounded at the corner; dorsum covered with minute pubescence; basal transverse impression somewhat sulciform, parallel to basal margin. Scutellum small.

Elytra elongated oval, widest at about middle, with obtuse shoulders; sides completely bordered, moderately reflexed at middle, but the borders become diminished anteriorly at the prehumeral parts though almost reaching basal peduncle; lateral margins minutely ciliated in basal third; dorsum convex, minutely pubescent, more densely so at the sides than on the disc; striae deeply impressed and crenulate near suture but obsolete at the sides, striae 1 and 2 deep on the disc but evanescent in both basal and apical areas, 3 either perceptible between dorsal pores or superficial and fragmentary, 4 vestigial, 5–7 obsolete, 8 impressed only in apical portion; scutellar striole very short, arcuate; apical striole deep but very short, straight in anterior part; stria 3 with two setiferous dorsal pores, preapical pore present on apical declivity and more distant from apex than from suture; marginal series of umbilicate pores not perfectly aggregated, the fourth pore of the humeral set evidently distant from the anterior three and the first pore somewhat isolated, the two pores of the middle and apical sets close to each other, respectively.

Ventral surface minutely pubescent; each sternite with a pair of paramedian setae; anal sternite provided with a pair of marginal setae in ♂, two pair of them in ♀. Legs of moderate length; protibiae gently dilated towards apices, wholly pubescent, and not externally grooved; metatibia about four-ninths as long as elytra; tarsi rather short, metatarsus about three-fourths as long as metatibia, tarsomere 4 with a long ventral apophysis in pro- and mesotarsi; in ♂, two proximal protarsomeres rather widely dilated, stoutly produced inwards at apices, and furnished beneath with adhesive appendages.

Aedeags small, elongate, widely membranous on dorsum, markedly curved to the right and twisted at the apical part, and abruptly dilated into two acute triangular lobes, which are produced in the opposite direction on a straight line oblique to the axis of aedeagus; basal part hardly curved ventrad, with large basal orifice whose sides are emarginate; sagittal aileron very large though thin and hyaline. Inner sac armed with a large elongate anisotropic copulatory piece, which is thin, lamellar and spatulate, being covered with poorly sclerotized scales. Styles short and stout, with short apical

parts, each bearing four or five thin setae at the apex.

Range. Known so far only from the type species endemic to Shennongjia in western Hubei, West-central China.

Notes. With the exception of the elongate body form, this new genus resembles *Dabatrechus* S. UÉNO (2004, p. 266) of the *Agonotrechus* series in many respects. They share similar buccal organ excluding mandibular dentition, degeneration of microsculpture, subpedunculate pronotal base, simple dorsal chaetotaxy of elytra, and pubescent protibiae. Peculiar modification of the male genitalia also suggests its relationship to the *Agonotrechus* series. On the other hand, *Shennongotrechus* is unique in the microscopical pubescence covering its body surface and the pubescent eyes. The latter peculiarity is currently considered as an archaic character, well known in the members of the tribe Perileptini but quite exceptional in the tribe Trechini. One of such exceptions is the genus *Oroblemus* S. UÉNO et A. YOSHIDA (1966, p. 77; also UÉNO, 1983), which belongs to the *Trechoblemus* series. The elongate body form shown by *Shennongotrechus* also resembles that of the oculate members of this genus-group. However, the resemblance appears superficial, since there are many definite differences between the new genus and the genera of the *Trechoblemus* series. The true affinity of *Shennongotrechus* could be determined when more information can be obtained by future investigations on or near the Daba Shan Mountains on which lies the Shennongjia forest area.

This new genus is named after Shennong, god of agriculture and pharmacy, whose residence is called Shennongjia.

Shennongotrechus politus S. UÉNO, sp. nov.

(Figs. 1–3)

Length: 3.55–3.73 mm (from apical margin of clypeus to apices of elytra).

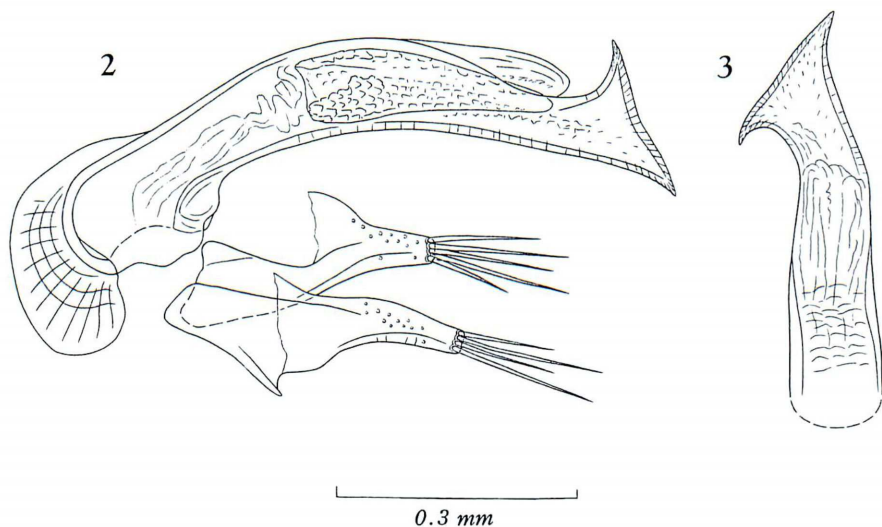
Since the genus *Shennongotrechus* is monotypical at present, all the characteristics described under the genus are naturally possessed by the type species. Therefore the following description of the species is mainly concerned with morphometric data.

Body fairly elongate with appendages of moderate length, wholly covered with very minute pubescence, but polished due to the absence of microsculpture. Colour brown, with more or less darker elytra which bear faint iridescence; antennae, palpi, venter of hind body, and legs yellowish brown.

Head transverse, about three-fourths as long as wide, widest at the mid-eye level, with small flat eyes and tumid genae, the latter of which are five-sevenths to five-sixths as long as the former; frontal furrows deep throughout and widely divergent in front and behind; antennae fairly short and stout, reaching basal three-eighths of elytra, scape thick, pedicel the shortest, about two-thirds as long as segment 3, which is subequal in length to 4, segments 5–10 gradually decreasing in length towards apex, 5 or 6 nearly three times as long as wide, terminal segment about as long as scape and nearly 1.5 times as long as segment 10.

Pronotum subcordate, wider than long, evidently wider than head, widest at two-thirds from base, and more gradually narrowed towards base than towards apex; PW/HW 1.28–1.40 (M 1.35), PW/PL 1.14–1.17 (M 1.16), PW/PA ca. 1.53–1.61 (M ca. 1.57), PW/PB ca. 1.52–1.59 (M ca. 1.56); sides strongly rounded in front, nearly straight behind middle or sometimes almost invisibly sinuate before hind angles, which are obtuse and narrowly rounded; lateral borders extremely narrow at front angles but continuous inwardly; apex gently arcuate forwards, very slightly narrower than base, PA/PB ca. 0.98–0.99 (M ca. 0.99); front angles rounded off; base briefly but deeply emarginate on each side just inside hind angle; dorsum well convex, steeply declivous at the sides; median line sharply impressed, reaching neither apex nor base; apical transverse impression distinct at the median part, either longitudinally wrinkled or smooth; basal transverse impression somewhat sulciform, laterally extending to lateral emargination of basal margin; basal foveae small but deep.

Elytra elongated oval, evidently wider than prothorax, much longer than wide, widest at about middle, and a little more gradually narrowed towards bases than towards apices which are conjointly rounded and rather narrow; EW/PW 1.40–1.49 (M 1.45), EL/PL 2.54–2.65 (M 2.58), EL/EW 1.52–1.56 (M 1.54); shoulders widely arcuate, with prehumeral borders oblique and very slightly arcuate; sides feebly arcuate from behind shoulders to the level of the apicalmost pore of the marginal umbilicate series, and hardly emarginate before apices; dorsum convex though longitudinally depressed on the disc, steeply declivous at the sides, apical declivity rather gentle; striae as described under the genus, stria 3 with two setiferous dorsal pores at basal 1/6 or a little before that level and about middle; preapical pore located on apical declivity at



Figs. 2–3. Male genitalia of *Shennongotrechus politus* S. UENO, gen. et sp. nov., from the Shicao He Valley in Shennongjia; left lateral view (2), and apical part of aedeagus, dorso-apical view (3).

about apical 2/9 and not adjoining any stria.

Legs moderate in length; tarsi rather short, tarsomere 1 about as long as tarsomeres 2–4 combined in both meso- and metatarsi.

Male genital organ small and rather lightly sclerotized. Aedeagus one-third as long as elytra, feebly arcuate at middle but nearly straight at the basal part; apical part fairly broad, right apical lobe protrudent dorso-proximally, while the left apical lobe is produced ventro-apically, each with acute, slightly recurved tip; ventral margin widely and lightly emarginate at middle in profile; copulatory piece elongate, about three-sevenths as long as aedeagus, gradually narrowed apicad and blunt at the extremity. Each style with four or five thin apical setae of various lengths.

Type series. Holotype: ♂, allotype: ♀, paratype: 1 ♂, 10–VI–2004, S. UENO leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Shicao He Valley, Longtouzhai, 1,460 m in altitude, in Muyu Zhen of Shennongjia, western Hubei, West-central China.

Notes. As was noted in the introduction of the present paper, this interesting species was found in coexistence with *Trechus (Epaphius) qinlingensis shennongi* to be described on the following pages. Every specimen of the type series was sifted out from a handful of humid leaf litter together with one or two specimens of *T. q. shennongi*, though both the species were by no means common. This mode of occurrence looks similar to that of certain species of the *Agonotrechus* series, and is different from that of the oculate members of the *Trechoblemus* series, which are always highly hygrophilous even in brachypterous ones.

***Trechus (Epaphius) qinlingensis shennongi* S. UENO, subsp. nov.**

(Fig. 4)

Length: 2.78–3.00 mm (from apical margin of clypeus to apices of elytra).

Closely similar to the nominotypical subspecies and agreeing well with the latter inclusive of the standard ratios of body parts and basic configuration of male genitalia, but different from it in the following points: antennae a little shorter and stouter, reaching basal fifth to two-ninths of elytra, with thicker middle segments; pronotum widest at a level between five-ninths and two-thirds (usually at about five-eighths) from base; lateral portions of pronotal base almost perpendicular to the mid-line though usually somewhat arcuate, instead of being oblique, with hind angles less obtuse but usually denticulate; front angles of pronotum more narrowly rounded; striae 1 and 2 of elytra more deeply impressed and more coarsely punctate, stria 3 shallower and often fragmentary, though coarsely punctate; preapical pore absent. Elytral stria 3 with two setiferous dorsal pores at basal 1/7–1/6 and about middle. Standard ratios: PW/HW 1.34–1.40 (M 1.37), PW/PL 1.35–1.46 (M 1.41), PW/PA 1.44–1.59 (M 1.51), PW/PB 1.34–1.40 (M 1.37), PB/PA 1.05–1.18 (M 1.11), EW/PW 1.52–1.59 (M 1.55), EL/PL 2.87–3.08 (M 2.99), EL/EW 1.32–1.42 (M 1.37).

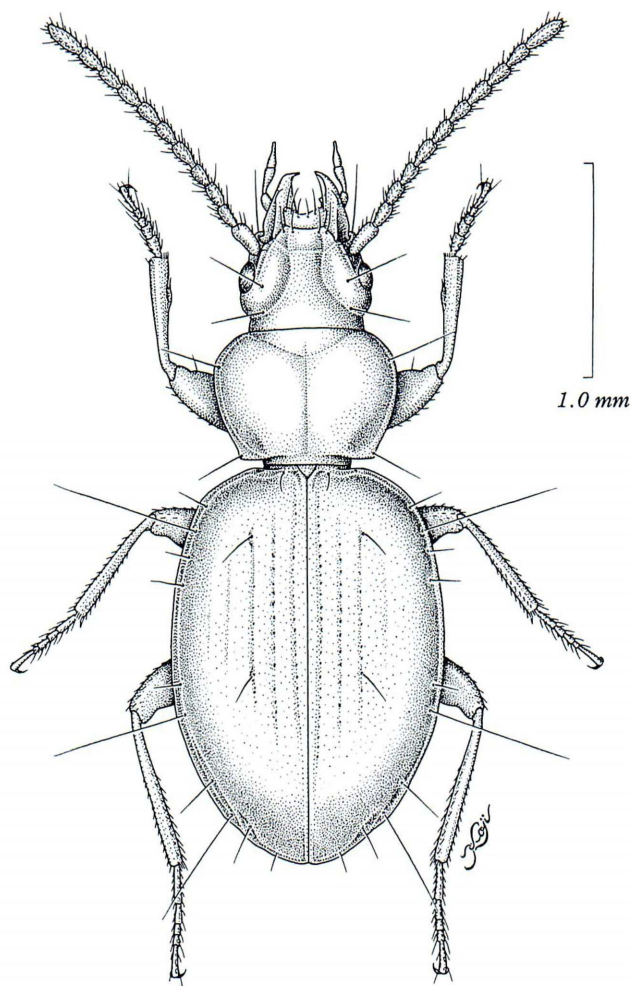


Fig. 4. *Trechus (Epaphius) qinlingensis shennongi* S. UENO, subsp. nov., ♂, from the Shicao He Valley in Shennongjia.

Aedeagus a little smaller and shorter than in the nominotypical subspecies, about one-fourth as long as elytra, with the basal part obviously shorter and proximally less produced and the apical lobe narrower in profile and not reflexed. Styles bisetose as in the nominotypical subspecies.

Type series. Holotype: ♂, allotype: ♀, paratypes: 9 ♂♂, 1 ♀, 10–VI–2004, S. UENO leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Shicao He Valley, Longtouzhai, 1,460 m in altitude, in Muyu Zhen of Shennongjia, western Hubei, West-central China.

Notes. It was most unexpected that an isolated population of *Trechus qinlingen-*

sis was found in Shennongjia at the eastern part of the Daba Shan Mountains. The new locality is nearly 300 km distant to the southeast in a beeline from the locality of the type population on the Qin Ling Mountains, and besides, the two mountain ranges on which lie the localities of the respective populations are separated by the wide valley of the Han Shui River. It is therefore possible that complete speciation could have taken place between the two isolated populations of the apterous trechines.

For this reason, I have carefully compared the Shennongjia specimens with a paratype of *T. qinlingensis* and its original description given by MORAVEC and WRASE, and finally come to the conclusion that the differences observed between them do not suffice for recognition of a full new species for the Shennongjia trechine. Even the presence or absence of the preapical pore on the elytra is subject to individual variation in certain Chinese species of trechines, and in the paratype of *T. qinlingensis* before me, the pore is vestigial and devoid of seta on both the elytra though its trace is clearly detectable. In my present opinion, the Shennongjia trechine can be regarded most appropriately as a new subspecies of *T. qinlingensis*.

Trechus shennongjianus (DEUVE) (2002, p. 158, figs. 2, 14), occurring at higher elevations of the same mountain, is also closely related to *T. qinlingensis*, but is readily discriminated from the present subspecies by the more brownish coloration (often with infuscated fore body) and less strongly convex elytra with less deeply impressed second stria. It is evidently different from *T. q. shennongi* also in the configuration of the male genitalia; the aedeagus is much larger (about two-fifths as long as elytra), more elongate, with distinctly reflexed apical lobe and apically blunt copulatory piece. Incidentally, my specimens of *T. shennongjianus* were collected on 8 June 2004 at Chang'yanwu (2,240 m above sea-level) at the northern skirts of Dashennongjia (3,052 m in height) or rather at the west-northwestern skirts of Jinhou Ling (3,019 m in height). They were sifted out from leaf litter deposited among moss-covered rocks in a deciduous broadleaved forest at the side of a swiftly running stream.

As regards the etymology of the new subspecific name, refer to the notes following the description of the genus *Shennongotrechus*.

要 約

上野俊一：中国湖北省神农架で見つかった腐植性チビゴミムシ類の1新属新種と1新亜種。——中国湖北省の西端部にある神农架林区は、大巴山脈の東端部近くに位置し、山麓から頂上部まで原生林のよく保全されていることで知られる。とくに林区の南部は、国家級自然保護区のひとつとして厳重に管理され、特別の許可を受けなければ調査することができない。この保護区からこれまでに報告されたチビゴミムシ類は4種あるが、石灰洞で発見された1種を除けば、いずれも最高点の大神農架付近からただ1点の標本に基づいて記載されたものであった。しかし、今年の初夏に行った調査で、大神農架の南東麓を流れる石槽河の溪谷から腐植性の2種が発見され、いずれも未知のものだと判定されたので、この論文で命名して記載した。

2種のうちのひとつは、陝西省の秦嶺山脈から記載された *Trechus* (*Epaphius*) *qinlingensis* の1

地方型だと考えられるが、他のひとつは、今のところ真の類縁関係が明らかでない。ハバビロチビゴミムシ群のものに似ている点も少なくないが、体形は細長く（つまり幅広ではなく）、アトスジチビゴミムシ群のものともいくつかの重要な形質を共有する。それで、この種に新属を設けて *Shennongotrechus politus* S. UENO と名づけ、もういっぽうの種には *Trechus* (*Epaphius*) *qinlingensis shennongi* S. UENO という新名を与えた。

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